UNIVERSITY OF ESWATINI

SEMESTER 1: MAIN EXAMINATION PAPER, FEBRUARY 2021

B. Sc., B.Ed, BA.SS, BA.HUMS.

FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND PLANNING

COURSE CODE:	**GEP111**
PAPER TITLE:	**Introduction to the Physical Environment**
TIME ALLOWED:	**Three (3) Hours**

INSTRUCTIONS:

1. **This paper consists of Section (A) and (B)**
2. **Section(A): techniques and skills is compulsory, Answer all questions (in this section)   allocated 40 Marks**
3. **Section(B): short answers / essays is compulsory Answer all questions (in this section)   allocated 35 Marks**
4. **Section(C): short answers / essays, Answer any questions from this section   allocated 25 Marks**
5. **Illustrate your answers with examples and clearly drawn diagrams where appropriate**

SPECIAL REQUIREMENTS: Graph paper, Tracing paper, Map of Swaziland 1:50 000 Big Bend Sheet No. 25)

ALLOCATION OF MARKS: Total marks for the paper is 100

Candidates may complete the front cover of their answer book when instructed by the Chief Invigilator and sign their examination attendance card but must NOT write anything else until the start of the examination period is announced.

No electronic devices capable of storing and retrieving text, including dictionaries and any form of foreign material may be used while in the examination room

DO NOT Turn examination paper over until instructed to do so

GEP111: INTRODUCTION TO THE PHYSICAL ENVIRONMENT- FEBRUARY 2021

SECTION A: TECHNIQUES AND SKILLS (40 MARKS)
COMPULSORY

QUESTION 1
(For all questions requiring a map, refer to 1:50 000 Map of Swaziland: Big Bend Sheet No. 25)

a) What is a Six's thermometer?   (2 marks)
b) Using the map provided, give the 6-figure grid reference of the following locations:
    i)   Lubuli trigonometric station   (2 marks)
    ii) Manyonyane School   (2 marks)

c) What features are found at the following locations?
    i)   -380884   (2 marks)
    ii) -928660   (2 marks)

d) If the time at Greenwich is 03.00 hours, what will the time be at the following locations?
    i) 36°S   (2 marks)
    ii) 171°W   (2 marks)

e) Calculate the straight line distance between Lubuli Trigonometric station and Ntuthwakazi School, in both metres and kilometres.   (4 marks)

f) Using the map provided, calculate the total surface area for Farm no.R/602 in hectares and square kilometres.   (6 marks)

g) Copy and complete Table. 1 below   (6 marks)
Table 1: The relationship between area of maps, scale and true area on earth

Area on Map	Scale of Map	True area on Earth
29.6cm²	1:135 000	……..…….km²
……..……cm²	1:50 000	236.7 ha

h) A camera, with a focal length of 15.0 cm, mounted on an aircraft flying at an altitude of 10800 metres above sea level was used to take photographs of the western and eastern border points of Eswatini; Ngwenya (1480 metres) and Big Bend (100 metres), respectively.
    i)   Considering the different altitude of both locations, calculate the mean scale of the photographs.   (6 marks)
    ii) If the same camera was used to take photographs of both locations at a scale of about 1:50 000, calculate the respective flying height of the aircraft.   (4 marks)

(40 Marks)

ANSWER SECTIONS B AND C IN A SEPARATE ANSWER BOOK FROM SECTION A

SECTION B: (35 Marks)

QUESTION 2:

a) Describe the term 'Ring of Fire' in the context of the theory of plate tectonics, and explain the existence of this 'ring'. (15 marks)

b) Discuss WHY the inclination of the earth's axis is an important factor in regulating the temperature of the earth. (10 marks)

c) Explain any <u>FIVE</u> of the following terms or concepts BRIEFLY: (10 marks)

  i) Groundwater table
  ii) Troposphere
  iii) The ozone layer
  iv) Aquifer
  v) Shield volcano
  vi) Constructive plate margin
  vii) Subduction zone

SECTION C: ANSWER EITHER QUESTION 3 <u>OR</u> QUESTION 4 (25 Marks)

QUESTION 3:

a) Explain why the term 'Global Climate Variability' is more accurate than 'Global Warming'. (7 marks)

b) Explain the beneficial consequences of the Earth having an inclined axis. (8 marks)

c) Scientists argue that the earth's atmosphere has not been constant in its composition over the duration of its history. Explain the manner in which it is believed to have changed, citing the driving forces causing such change, and give the present composition. (10 marks)

OR

QUESTION 4:

a) Explain in detail why fold mountains, volcanic activity, and earthquakes occur in the same regions of the earth's crust. (15 marks)

b) Explain why scientists have concluded that there is a heat exchange between the equatorial and the polar regions of the Earth. (10 marks)

* * * * * *

Equations

Fahrenheit to Celsius: $^\circ C = \frac{5}{9}\left(^\circ F - 32\right)$

Celsius to Fahrenheit: $^\circ F = \frac{9}{5}{}^\circ C + 32$

Kelvin to Celsius: $K = {}^\circ C + 273.15$
Celsius to Kelvin: $^\circ C = K - 273.15$
Fahrenheit to Kelvin: $K = {}^\circ F + 457.87$
Kelvin to Fahrenheit: $^\circ F = K - 457.87$

1 centimeter	= 10 millimeters	1 cm	= 10 mm
1 meter	= 100 centimeters	1 m	= 100 cm
1 kilometer	= 1000 meters	1 km	= 1000 m
1 inch	= 2.54 centimeters	1 in	= 2.54 cm
1 foot	= 30.48 centimeters	1 ft	= 30.48 cm
1 yard	= 91.44 centimeters	1 yd	= 91.44 cm
1 yard	= 0.9144 meters	1 yd	= 0.9144 m
1 mile	= 1609.344 meters	1 mi	= 1609.344 m
1 mile	= 1.609344 kilometers	1 mi	= 1.609344 km

$$R_o = \ldots \sigma T^4 \left(0.56 - 0.09\sqrt{e_s}\right)\left\{0.1 + \left(0.9 \times (n \div N)\right)\right\} \ mm/day$$

$$\frac{e}{e_s} \times 100$$

$$K = \left(12.06 - T\right)\left(4\sqrt{v+5} - v/4\right)$$

$$R = \frac{(1 \div A)\left(\sum R_j a_j\right)}{n}$$

$$R = (1 \div n)\left(\sum R_j\right)$$

$$R = (1 \div A)\left(\sum r_i a_i\right)$$

$$R_i = 0.95 R_a \times (n \div N) \ mm/day$$

$$Q = m^3/s$$

$$q_j = \frac{(v_j + v_{j+1})}{2}\frac{(y_i + y_{i+1})}{2} b_j$$

$$Q = \sum q_j$$